



FARMING
connect
cyswllt
FFERMIO

Focus Site Project Review

Improving suckler cow efficiency by optimising mature cow body weight

Lan Farm, Cynwyl Elfed

Prepared by;-

Mair Morgan/Helen Ovens

RSK ADAS Ltd

Unit 10D

Cefn Llan Science Park

Aberystwyth

SY23 3AH

Date: March 2017

Tel: 01974 847000

Email: helen.ovens@adas.co.uk



Cwmni Amaethyddol Ewrop ar
yfrif Ddeddfydd Gwledig
Ewrop yn Bwrddodi mewn Ardaloedd Gwledig
European Agricultural Fund for
Rural Development
Europe Investing in Rural Areas

Llywodraeth Cymru
Welsh Government

Contents

- 1 Summary..... 1**
- 2 Business Review..... 4**
 - 2.1 Comparable farm data..... *Error! Bookmark not defined.*
 - Physical Benchmarking 4
 - 2.2 Test Results 4
 - 2.3 KPIs 4
 - 2.4 Potential impact of the project on business..... 5
- 3 Project Review 6**
 - 3.1 Aims of the project 6
 - 3.2 Test results and discussion..... 6
 - Cow efficiency (Calf Weight as % of Cow Weight)..... 6
 - 2yr v 3yr calving 7
 - Housing weights 2016 7
 - Reducing calving interval..... 8
 - 3.3 SWOT Project analysis 9
 - 3.4 Farmer perspective of the project10
 - 3.5 Sensitivity analysis.....11
 - 3.6 Alignment to sector’s strategic goals11
- 4 Impact on the industry.....12**
 - 4.1 Impact on individual business12
 - 4.2 Impact on wider industry12
 - 4.3 Impact on Welsh Government’s cross cutting and priority themes.....13
 - Climate change.....13
 - Animal Health and Welfare (AHW)13
 - Future Generations.....13
 - Tackling Poverty13

1 Summary

Lan Farm, Cynwyl Elfed, Carmarthen is an organic 172hectare upland farm running 120 black Limousin suckler cows producing 10-14 month old calves for sale. There is a further 10ha of woodland on the farm which is part of the Glastir Entry scheme. About half of the farm is owner occupied and half is rented, all within four miles of the farmstead. Other livestock on the farm constitute tack sheep for a maximum of four months over the winter.

The original herd was based on Welsh Black genetics and Charolais bulls. A black Limousin bull was used to produce replacements. In the last four years use has been made of AI to breed replacement females selecting mainly Black Limousin bulls with the following EBV characteristics: Good direct calving ease, Top 25% maternal traits, Positive maternal calving ease, top 10% 200 day and 400 day growth figures. AI is now used on a group of 40 cows that calve within a three week period, in order to move towards a more compact bulling period. Black Limousin bulls are used on the remaining 60 cows and 20 heifers.

Business aspirations:

A more efficient, profitable herd by running a herd that has a more uniform cow weight.

A move to lower cow mature weights resulting in reduced cow maintenance costs, thereby increasing efficiency and profitability while also reducing greenhouse gas emissions.

Phil Jones at Lan Farm has grasped every opportunity to improve his herd over the past seven years, starting with tackling Bovine Viral Diarrhoea (BVD) in 2010, followed by improving his handling facilities and investing in weigh scales. This is against a background of changes from native to continental genetics together with the use of high growth EBV sires to produce replacement heifers.

Suckler beef farmers who have taken on board the message to use high growth EBV bulls in their herds are now faced with replacement females that are increasing in mature size, with the added cost of maintaining heavier (larger) cows. Many farmers believe that a bigger cow produces a heavier calf and will be worth more as a barren cow, but this project proves the principle that it is in fact the lighter cows in a herd that prove to be the most efficient.

Focus Farm Project key objectives:

1. To evaluate changes in cow mature weight and cow efficiency in terms of weight of calf weaned as a percentage of cow weight.
2. To assess the value of calving replacement heifers at 2 years old rather than 3 years old
3. Reducing the herd calving interval.

Organic farming limits the production capacity of each hectare at Lan Farm, and current silage stocks are just adequate to get through the winter. Therefore, an increase in maintenance feed requirement and dry matter intake (i.e. the feeding requirements of heavier cows) would not be welcome.

Project conclusions

The data collected at Lan Farm has proved that lighter cows are the most efficient in terms of calf weight at weaning as a percentage of cow weight.

1. Cow size

- A cow weighing 700kg+ costs an additional £50 per cow per year to maintain than a 500kg cow¹. Lan has 9 cows weighing over 700kg. Replacing these with 500kg cows would save the business £450 per year, without any loss in productivity.
- Cow efficiency at Lan: cows under 550kg were the most efficient in the herd.

A reduction in cow size at Lan gives Phil the option of increasing herd size, without increasing input costs.

More output: being able to keep 30 more cows should generate an additional 30 more calves per year, if the cows are operating at their optimum. Valued at £700 each, this should generate an additional £21,000.

Lower maintenance costs: comparing a 750kg cow against a 500 kg cow, maintenance demand is 25mj/cow/day less, which equates to £75/annum/animal (in the region of £600 savings over 8 year life of a cow).

2. Calving interval

Industry calculations indicate that a calving period extended beyond 12 weeks costs a beef enterprise an additional £3.50 per day per cow, in labour and feed costs¹.

At Lan, a move from calving 73% of the current herd in 6 weeks, to 90% in 6 weeks is worth in the region of £4,000 p.a. to the business.

3. Calving heifers at 2 year old instead of 3 year old

Calving at the recommended age of 24 months could yield up to 2 more calves per cow over her lifetime, which could equate up to an additional £4,000 a year for an average 25 strong Welsh beef herd¹.

Lan now has 5% of its herd calving at 24 months, which should equate to nearly £3,000 additional income to the business (i.e. from an extra calf/cow life)¹.

Increasing herd size from 120 to 130, and calving the new intake at 2 years of age (rather than at 3 years of age) would result in an additional £6,000 per year/cow from these animals¹, made up of savings in rearing costs and gross margin generated.

4. Eradicating BVD at Lan Farm

Eradicating BVD at Lan has helped reduce veterinary costs by 16%, and ensured that his 120 strong herd operates more efficiently.

The impact of BVD at Lan was as follows:

- 3 of Phil's best calves died as a result of BVD, valued at £700 per head – a loss of £2,100 to the business.
- Eradicating BVD has resulted in a radical reduction in pneumonia incidence. Phil has not had to treat any animals for pneumonia since removing BVD from the herd. This has reduced his medicine usage – antibiotics were costing £480 at the peak of the infection.
- Calf LWG improved after BVD eradication by around 10kg/head over 4 months post weaning valued at £2.50/kg – this equates to £2,500 in total for 100 calves.
- Fertility improvement after eradication rose from 82% to 95% calves reared, resulting in 13 more calves successfully weaned, at £700 per head (a benefit of £9,100 to the business)

Take home points for the industry:

Bigger cows may look good, but experience at Lan shows that they don't earn their keep. When the 10 heaviest cows are compared to the 10 lightest cows, it is clear there is little effect on calf weaning weights and a huge impact on cow efficiency (10%). Cows over 650kg had a cow efficiency below 50%, and this decreased further to 42% for cows over 750kg.

Tackling cow efficiency can feel daunting, but small steps make a big difference –start by weighing cows and calves, and using the data to assess business performance. Robust evidence from year on year data collection gives the farmer confidence to embark on herd performance projects. Start by improving the calving interval, working towards the optimum of 365 days.

Establish what you are operating at currently, set your own interim targets and then work towards the targets shown below at a pace suitable for your herd.

- Calvings per cow and heifer put to the bull – 95%
- Barren cows – 5% or less
- Cows calving in first 3 weeks – 65%
- Bulling periods – 9 weeks for cows and 6 weeks for heifers
- Calf mortality birth to weaning – less than 3%
- Calves reared – 94% (calves reared to cows and heifers bulled)
- Replacement rate - less than 15%

It is important to make sure that any gains in suckler cow efficiency by weaning a heavier calf is not at the expense of body condition with a subsequent impact on fertility. This is much easier to manage if 60%+ of the herd calve in first three weeks.

Many beef enterprises can't tolerate major changes quickly. Lan shows that tackling cow efficiency long term has immediate benefits in terms of freeing up time to focus on other aspects of the herd, such as body condition scoring, and will have substantial financial benefits in the medium to long term.

It may be of value to consider technologies used in the dairy industry and tailor that expertise to suit your beef system –make it work for you. Using the Genus Reproductive Management system may not be for you, but consider the use of AI to help reduce calving intervals and optimise conception rates.

BVD has a direct negative affect on the financial performance of a beef enterprise. It is predicted that BVD costs £13 and £31 per cow in Great Britain. The cost of eradicating it is significantly outweighed by the benefits, with a reduction in veterinarian costs, an increase in calves reared, better liveweight gain, and a reduction/eradication of pneumonia from the herd.

2 Business Review

Physical Benchmarking

Cow weights have been increasing year on year at Lan Farm without a corresponding increase in calf sales. Heavier cows have higher maintenance costs (as outlined in the Farming Connect Factsheet '[Optimising Efficiency in the Suckler Herd](#)'). This project has provided Phil with an opportunity to reconsider maternal weight and calf weight relationship, i.e. cow efficiency.

	Lan 2014/15	Lan 2015/16	FBS 2015/16 (Upland) All herds	FBS 2015/16 (Upland) Top third
Cows to Bull	95	106	51	56
Calves reared	0.96	0.92	0.91	0.94

2.1 Test Results

To avoid repetition, the test results are outlined in full under section 3.2 in the Project Review further on in this report.

2.2 KPIs

The main KPIs Phil refers to on his farm are:

- Calving interval
- Cow mature weight
- Number of heifers calving at 2 years
- Cow efficiency

These KPIs all relate to Phil's interest in Cow Efficiency. Cow efficiency is not something that is widely recorded in the UK at a farm level and Phil has set his own target: **to improve year on year and to be always above 50%**. Heavier cows also require greater feed resources to sustain condition and reproduction in order to maintain optimum calving interval.

A recent study of nine Northern Ireland demo farms averaged a cow efficiency figure of 44%¹. If genetics and rearing conditions allow, progressive beef producers in Wales could aim for 70% efficiency, which is being achieved in other efficient beef producing nations.

Significant progress has been made with the calving pattern at Lan Farm, showing continuous improvement in calving interval from 404 days down to 380 before reducing further to 368 days. This is considerably less than the Welsh national average of 428 days.

73% of the herd is currently calving within 6 weeks, however the farm is working towards calving 90% in 6 weeks, and 65% of the herd in the first 3 weeks.

The calving period at Lan is currently at 100 days, 10 days more than aimed for, so there is still more work to be done, despite the excellent progress to-date. The financial returns to the business has not yet been fully costed, but for every day the calving interval is decreased, Lan Farm is likely to be saving up to

¹ Data presented at Lan Farm open day by Ian Pritchard, January 2017.

£3.50/cow/day, based on industry figures². Phil however already knows he is benefitting, as a shorter calving interval has released a significant amount of time that he can re-invest into herd management. KPI progress is detailed further in section 3 of this report.

2.3 Potential impact of the project on business

The aspiration is that lower cow mature weights would result in reduced cow maintenance costs thereby increasing efficiency and profitability. For example Phil could keep 30 more cows if they were all in the lightest 12 category (average weight 521 kg) compared to the heaviest 12 (average weight 678 kg), and produce 10,000 more kg of calf increasing the Gross Output and therefore increasing Gross Margin.

Calculation: 100 calves x weaning weight 302kg (12 heaviest cows) = 30,200 kg

130 calves x weaning weight 315kg (12 lightest cows) = 40,950 kg

At the same time maintenance costs could be reduced. Comparing a 750kg cow against a 500kg cow, maintenance demand is 25mj/cow/day less for the lighter cow, which equates to £75/annum/animal (resulting in the region of £600 savings over 8 year life of a cow).

Phil is now working towards reducing cow weight and doesn't think he will really see huge improvements for at least two years. It would take several seasons to get the whole herd in the ideal cow weight bracket (below 650kg), as Phil does not wish to sell too many of the heavier cows, does not have enough replacements and does not wish to push the replacement cost up too much. He is steadily culling outlying calvers and culls are being selected on a combination of cow weight and calving date.

The extra output from calving all replacement heifers at two years in the future will also increase Gross Output.

Lan Farm has worked hard to implement and maintain a block calving period, and with tight fertility management has achieved a drop in calving interval from 410 to around 370 days. Reducing the calving interval by 40 days is predicted to save at least £140 (each day the calving interval extends beyond 365 days it costs in the region of £3.50 per day)³. There are multiple benefits of reducing calving interval such as:

- cows being at a similar stage in their cycle to return to the bull,
- calves being a more uniform size to carry out management tasks and to sell, and therefore,
- more efficient use of labour.

Shorter calving periods result in heavier weaning weights, and also contribute to cow efficiency⁴.

As part of the project, the Genus Reproductive Management system is used at Lan Farm. This is rarely seen on beef farms, however is frequently used on dairy farms. Cows are walked and chalked daily by a trained Genus technician. Any cows showing signs of heat if eligible will be selected for breeding. Breeding records are kept by the technician and printouts provided for customers when required e.g. a list of cows for the vet to check, a list for P.D., a list of pregnant cows by due date.

This has helped Phil achieve these reduced calving intervals at Lan. The calving interval is considerably less than the Welsh national average of 428 days, and is close to the accepted industry target of 365 days.

² Basil Lowman, Beef Specialist, SAC Consulting

³ Basil Lowman, Beef Specialist, SAC Consulting

⁴ QMS Guide To Improving Suckler Herd Fertility, <mailto:lynwen.comins@live.co.uk>

73% of the herd currently calves within 6 weeks, however the farm is working towards calving 90% in 6 weeks.

Phil is using AI as a management tool to compact the calving period. Phil is convinced that spending an hour a day with the AI technician checking the herd is more valuable in terms of herd analysis and use of time, rather than going out to the field four or five times a day to see if bulling or running the risk of using a poor performing bull. The work done with the AI technician means that Phil can work towards his 90% herd calving in 6 weeks goal, which will realise circa £4,000 p.a. to the business.

Eradicating BVD has incurred some initial costs, but the benefits significantly outweigh any initial outlay. It is predicted that BVD costs £13 and £31 per cow in Great Britain. The impact of BVD, and the benefits of eradicating it at Lan are as follows:

- 3 of Phil’s best calves died as a result of BVD, valued at £700 per head – a loss of £2,100 to the business.
- Eradicating BVD resulted in a radical reduction in pneumonia incidence. Phil has not had to treat any animals for pneumonia since removing BVD from the herd. This has reduced his medicine usage – antibiotics were costing £480 at the peak of the infection.
- Calf LWG improved after BVD eradication by around 10kg/head over 4 months post weaning valued at £2.50/kg – this equates to £2,500 in total per 100 calves.
- Fertility improvement after eradication rose from 82% to 95% calves reared, resulting in 13 more calves successfully weaned, at £700 per head (a benefit of £9,100 to the business)

3 Project Review

3.1 Aims of the project

The main aim of the project was to improve suckler cow efficiency by optimising mature cow body weight. This involved three main aspects:

- Improving cow efficiency (calf weight at weaning as % of cow weight giving a measure of cow efficiency)
- Calving replacement heifers at 2 years old rather than 3 years old
- Reducing calving interval

3.2 Test results and discussion

Cow efficiency (Calf Weight as % of Cow Weight)

The overall herd average was 50.9% in 2015. The table below highlights that the heavier cows are not the most efficient at Lan. Cows under 550kg are the most efficient in the herd. Cows over 650 kg have a cow efficiency below 50%, this decreases to 42% for cows over 750kg.

	Number	Average Cow Weight	% Efficiency	Weaning Weight
<u>Cows Ex. 1st Calvers</u>				
< 550	7	525	55.8	293
551 – 600	19	583	53.6	313
601 – 650	14	623	52.3	326
651 – 700	13	672	47.2	317
701 – 750	6	721	43.8	316
751 - 800	3	775	42.1	321

When the 10 heaviest cows are compared to the 10 lightest cows, it is clear there is little effect on calf weaning weights and a huge impact on cow efficiency.

	10 Heaviest Cows		10 Lightest Cows	
	2014	2015	2014	2015
Cow Weight	678	734	546	530
Condition Score	3.2	2.8	2.2	2.2
Calf Weaning Weight	302	319	309	306
Days to Weaning	248	247	252	259
Cow Efficiency	43.4	44.5	57.7	56.6
(Adjusted to 200 days)	36.1	37.2	47.4	47.3

A cow weighing 700kg+ costs an additional £50 per cow per year to maintain than a 500kg cow¹. Lan has 9 cows weighing over 700kg. Replacing these with 500kg cows would save the business £450 per year, without any loss in productivity.

It is noticeable that in past 2 years the lightest cows have also weaned at lower condition scores which suggests that management according to condition score at weaning is vital to ensure that issues do not surface in the future such as delaying the time returning to the bull.

2yr v 3yr calving

Of the 1st calvers, those calving at 2 years of age averaged 594kg which was the same as those calving at 3 years of age. Range in weights for heifers calving at 2 was 536kg to 638kg and for those calving at 3 was 536kg to 650kg. This shows that the replacements at Lan Farm are ready to calve at 2 years of age.

Calves from 1st calvers at 3 years averaged 74kg heavier than those calving at 2 years. The average weaning (weighing) age was 284 days. 2nd/3rd calvers were weighed at the average age of 247 days and the older cows at 252 days. Although those calving at 2 years have weaned lighter calves on average (74kg), they have had a calf, a year earlier and, if managed well over the next couple of parities, they will rear more total weight of calf in their lifetime.

Once Phil reaches the goal of 130 head herd, if he is able to get all cows to produce a minimum of 1 calf per year for 8 years, he could potentially keep his replacement rate down to about 12.5% per annum. That is, to maintain numbers (at the 130 head herd level), he would only be required to rear (or purchase in, if required) 13 heifers per annum, calving at 2 years of age. Calving these 13 heifers at 2 years of age (rather than at 3 years of age) would result in an additional income of £6,000 per year/cow from these animals.

Calving at the recommended age of 24 months could yield up to 2 more calves per cow over her lifetime, which could equate up to an additional £4,000 a year for an average 25 strong Welsh beef herd¹.

Lan now has 5% of its herd calving at 24 months, which should equate to nearly £3,000 additional income to the business (i.e. from an extra calf/cow life)¹.

Housing weights 2016

	Average weight	Average calf weight	Average calving date	Efficiency
Heifers calving at 3 yrs	626kg	261.5kg	16/03/2016	41.6%
Heifers calving at 2 yrs	547kg	231kg	16/04/2016	42.2%

In 2016 the 2 year old heifers calved a month later and are still weaning weight more efficiently than the 3 year olds, along with producing an extra calf in their lifetime. This is the reason most figures are adjusted to 200 days for a fair comparison. It reduces the effect of a protracted calving spread. The next table shows the effect of adjusting the cow efficiency to the 200 day weaning.

	2014		2015	
	Non-Adjusted	Adjusted	Non-Adjusted	Adjusted
1 st Calvers	48.7	35.7	53.2	39.6
2 nd /3 rd Calvers	46.5	39.5	46.4	39.3
Older Cows	52.7	42.2	52.2	43.4

With the 1st calvers, 6 heifers calved at 2 years of age and 11 heifers calved at 3 years of age. Their efficiency figure has compared well with the 2nd/3rd calvers. These figures help justify focussing more effort on calving heifers at 2 years of age, rather than leaving them to start at 3 years of age.

	Non-Adjusted	Adjusted
Calved at 2	45.5	35.4
Calved at 3	57.6	41.9

The move to 2 year old calving is gaining momentum in suckler production and it may be that calving at a younger age can reduce lifetime growth potential, while the use of high growth genetics through the dam's sire can be maintained and will still be passed on to the calf.

At Lan, increasing herd size from 120 to 130, and calving the new intake at 2 years of age (rather than at 3 years of age) would result in an additional £6,000 per year/cow from these animals¹, made up of savings in rearing costs and gross margin generated.

However, it is important to make sure that any gains in suckler cow efficiency by weaning a heavier calf is not at the expense of body condition with a subsequent impact on fertility. This is much easier to manage if 60%+ of the herd calve in first three weeks.

Reducing calving interval

Industry calculations indicate that a calving period extended beyond 12 weeks costs a beef enterprise an additional £3.50 per day per cow, in labour and feed costs⁵

The decision was taken to introduce AI into the herd in the earliest calving group of cows. This allows the use of non-terminal sires to improve the genetic merit of heifers joining the herd for breeding and drop the calving interval for this group from 410 to 370 days.

Cows have a pre-breeding assessment three weeks prior to commencement of the service period. This includes body condition, ovarian function and uterine cleanliness. The aim is to ensure cows are cycling, and hold to the earliest service possible after calving.

⁵ Basil Lowman, Beef Specialist, SAC Consulting.

Cows are scanned 35 days after service to AI, and 6, 8 and 10 weeks after the bulls have gone in. A final scanning session is undertaken in late November to check for any losses.

The next table shows that as a result of using the Genus Reproductive Management system the pregnancy rate, conception rate, services per conception and average days to conception have all improved from 2013 to 2015. Herd productivity is becoming more efficient.

	2013	2014	2015
Pregnancy rate	31%	64%	72%
Conception rate	58%	75%	78%
Services per conception	1.7	1.3	1.3
Average days to conception	100	88	82

3.3 SWOT Project analysis

STRENGTHS	<ul style="list-style-type: none"> • Growing of red clover together with the ability to make high energy and protein silage that will sustain growth rates of over 1 kg/day post weaning without concentrate • 4 years' worth of data on cow and calf weights and BCS • The cows at Lan are mostly of medium weight (under 650kg), and are operating a good level of efficiency, i.e. weaning a calf that is over 50% of their own weight • Breeding a calf that has superior growth, maybe as a result of choosing good growth EBV bulls to breed the dam line, but also appear to be rearing it well • Full EID recording with links to a software management programme • Calving at 2 year old – rear more total weight of calf over cow lifetime • Compact calving reduces disease spread between old and young animals and reduces animal health interventions – getting more value out of vet time, only need to bring the group in once and can treat collectively • Compact calving produces more even batches for marketing and reduces labour • Scanning picks up any issues with cows not getting in calf, so action can be taken early • Calves have a high LWG from milk • Bulls and cows have a pre breeding assessment • Good herd health status <ul style="list-style-type: none"> • All cows vaccinated with Bovilis BVD 4 weeks prior to bulling • All calves tagged and test tagged at birth • 5 calves from each management group bled at 9-18 months of age • Premium cattle health scheme accredited BVD herd • Calf pneumonia vaccine has been adjusted, due to inconclusive BVD results on last blood tests
WEAKNESSES	<ul style="list-style-type: none"> • A number of changes at same time make it difficult to pin point greatest effect • Some selection criteria such as growth can be at the expense of fertility • Organic limiting options e.g. synchronisation • Variety of cow sizes make formulating a ration more difficult consequently resulting in over fat and over thin cows • Losing hybrid vigour/milkiness in herd

	<ul style="list-style-type: none"> • Increased labour requirement for AI
OPPORTUNITIES	<ul style="list-style-type: none"> • Increase calving at 2 year old <ul style="list-style-type: none"> • Heifers at Lan at the end of their first lactation are already weighing as much as the herd average • Heifers body condition score at weaning is as good as the mature cows • Genomics • Reducing cow size will increase profit per hectare and feed efficiency • Growing market for grass fed beef • Maintain calving interval around 365 days • Calve all heifers at 2 years • Change breed of some bulls to keep a crossbred animal to maintain hybrid vigour, milkiness, shorter gestation length, easier calving. This results in a quicker return to conception, and keeps calving interval low • Record calving ease for all heifers this year to try to correlate pelvic area and calving ease
THREATS	<ul style="list-style-type: none"> • 2nd and 3rd calvers are the most efficient in producing heavier calves, but they have done this at the expense of their own body weight and condition • Cow prioritises milk production over her condition and getting back in calf • Calving at 2 years could affect longevity & mature size (treating cows well post calving can avoid this) • Poorly grown and/or immature heifers suffer a higher risk of difficult calvings • Heifers may not have grown enough by mating • Late maturing continental breeds • Low proportion of heifers conceive to calve at 2 years • Risk of disease with purchased bulls • Growth rates may be affected if selection growth rate EBVs are taken too far- Need to be able to sell store cattle to a finisher that will grow and finish

3.4 Farmer perspective of the project

Phil decided to do this project as it fits with what motivates him on the farm; essentially working with the beef animals to get the most out of them, for as long as possible. He is interested in weighing and figures and enjoys analysing the data. He sees it as the only way to measure performance in a beef system.

The project has identified that bigger cows don't necessarily wean heavier calves, and certain don't operate as efficiently as lighter cows. This should help convince farmers that adjusting their genetics with careful production cycle management is well worth it, backed up by real farm datasets. Phil says that he now judges the performance of individual cows by figures, not by eye. He's looking for "good workers not good lookers".

The main issue Phil has experienced is a dud bull, however scanning the cows managed to pick this up early, without affecting calving interval too much. Other risks include the labour required with AI, however a bull is still available as backup. Phil has taken every opportunity to assist with project running smoothly. He has purchased new software and believes the best money spent was on a good handling system. It makes it easier to vaccinate etc. more efficiently, quicker and safer. This also helps encourage the vet to

be actively involved with scanning, pre-breeding assessments and other veterinary tasks. Genus would not participate without sufficient handling facilities due to health and safety concerns.

Phil has every intention to continue these practices and feels that he should have tried calving at two years many years ago. He would like to increase the frequency of weighing if possible, if time and labour allows.

Phil has been sharing the message that heavier cows do not produce bigger calves and are not more efficient to the wider farming community via meetings, an open day on the farm and as a lecturer at Gelli Aur College. He feels some attendees take home the message but is unsure how many implement it. The project principles are primarily only suitable for the commercial beef farmer and not pedigree breeders. He doesn't think enough people are weighing cattle, and this is the first step they need to take to monitor performance. They may realise that bigger cows are not producing heavier calves, however are not weighing, recording and analysing to really appreciate the impact this has on business performance.

3.5 Sensitivity analysis

A sensitivity analysis on some of the main physical KPIs would reveal the following figures to compare with the current system i.e. to show improvement in performance:

	Item	Change	Effect on Profit
i.	Number of calves reared per annum if herd composition changed from 100 heavier to 130 lighter cows	± number of calves	sale value on extra or less calves sold or transferred, which could total an extra 30 calves per annum
ii.	Variable costs/cow for the herd	± 10%	A reduction in feed costs/cow, with a small to medium (lighter) cow being cheaper to run than a larger (heavier) animal
iii.	Average calf weaning weight	± Kg/calf x £x /kg	If weaning weight higher results in feed cost savings, and an increase in kg sold. If weaning weight lower, kg output should still be higher due to higher overall number of calves sold.
iv.	Herd cow efficiency at 200 days Total weight calves at 200/ total weight of cows	± %	A physical measure of improvement KPI
v.	Heifer calving age rearing cost/day assumed £1/day above 2 year calving for 10 heifers/annum	± 1 months	Increase in output with minimum increase in costs, by rearing more cows/ha/year.

3.6 Alignment to sector's strategic goals

This work contributes to the Welsh Red Meat Sector's strategic objectives, specifically in relation to:

1. Increasing the weight of beef produced per cow
2. Decreasing the average calving interval
3. Improving production efficiency and its relevance in delivering climate change targets

4 Impact on the industry

4.1 Impact on individual business

For the full summary list of the impact of the project on this business, refer to the Project Conclusions box in the Summary section of this report.

The project has revealed that it is indeed the case for Lan that heavier cows don't pay; the figures have convinced Phil, and he is now working towards reducing the cow size, in order to run a more profitable enterprise.

However, evidencing the financial benefits of the project won't be feasible until the majority of the herd fall in the below 650kg category. Due to the low input low output nature of the business, this will take some time. Without making rapid changes to the production system and keeping high numbers of replacements (which would have a negative effect on cash-flow), it will take a number of years for the continuing increase in suckler cow efficiency to translate into a significant improvement in financial performance (i.e. coming through in the FBS figures)

This does not take away from the fact that Phil is totally convinced and committed to herd performance improvement through cow efficiency, and sees this as key to achieving a profitable beef system.

4.2 Impact on wider industry

Take home points for the industry are as follows (also provided in the Summary section of this report). They include the following:

Heavier cows may look good, but Lan figures show they don't earn their keep.

Tackling cow efficiency can feel daunting, but small steps make a big difference –start by weighing cows and calves, and using the data to assess business performance. Set interim targets, and then work towards the following industry recommended targets⁶:

- Calvings per cow and heifer put to the bull – 95%
- Barren cows – 5% or less
- Cows calving in first 3 weeks – 65%
- Bulling periods – 9 weeks for cows and 6 weeks for heifers
- Calf mortality birth to weaning – less than 3%
- Calves reared – 94% (calves reared to cows and heifers bulled)
- Replacement rate - less than 15%

It is important to make sure that any gains in suckler cow efficiency by weaning a heavier calf is not at the expense of body condition with a subsequent impact on fertility. This is much easier to manage if 60%+ of the herd calve in first three weeks.

Many beef enterprises can't tolerate major changes quickly. Lan shows that tackling cow efficiency long term has immediate benefits in terms of freeing up time to focus on other aspects of the herd, such as body condition scoring, and will have substantial financial benefits in the medium to long term.

⁶ http://www.qmscotland.co.uk/sites/default/files/QM2553SucklerHerd_A5Brochure_Ir.pdf

It may be of value to consider technologies used in the dairy industry and tailor that expertise to suit your beef system –make it work for you. Using the Genus Reproductive Management system may not be for you, but consider the use of AI to help reduce calving intervals and optimise conception rates.

BVD has a direct negative affect on the financial performance of a beef enterprise. It is predicted that BVD costs £13 and £31 per cow in Great Britain. The cost of eradicating it is significantly outweighed by the benefits, with a reduction in veterinarian costs, an increase in calves reared, better liveweight gain, and a reduction/eradication of pneumonia from the herd.

4.3 Impact on Welsh Government's cross cutting and priority themes

Climate change

Improving production efficiency will reduce greenhouse gas emissions especially as more of the lighter/smaller cows are dominating the herd producing more kg of meat. This project relates directly to this theme, with Lan proactively working to achieve an efficiently performing herd.

Animal Health and Welfare (AHW)

Considerable work has been done at Lan Farm and at the knowledge transfer events regarding BVD. Phil highlighted that all health issues have improved since vaccinating for BVD, and compacting calving has helped reduce many health issues such as scouring and pneumonia. Pneumonia vaccines are also used. Phil is also screening for Johne's disease and looking into Infectious Bovine Rhinotracheitis (IBR). Phil has adopted a comprehensive health plan that is put into practice at every possible level. The herd is part of the SAC Premium Cattle health scheme.

Whilst the project is not directly related to health and welfare, the work done on tightening the calving interval, the use of AI and culling cows that do not fit with the performance objectives has a direct impact on AHW at Lan. Phil now has more time to spend with the herd, and can give much more attention to detail as regards monitoring the health status of the cows and calves.

Future Generations

This project encourages technology uptake to analyse data to keep efficient cows. Adopting tools from the dairy sector, and making them work for a beef business shows innovation, and is a good take home message for the beef industry.

Running the herd more efficiently, freeing up time for additional activities, either within the farm business or outside is a key area of interest for future generations. Releasing time provides options for a family run enterprise, whether that be time to spend improving the core agricultural businesses, or embarking on alternative on or off farm income generation.

With the advent of Brexit the ability to access secure profitable markets long term for a Welsh Beef product is not clear. This uncertainty provides an additional drive for beef producers to run as resilient a business as possible, maximising herd performance, minimising costs, and releasing time for additional income generation activities.

Tackling Poverty

Producing more efficient cows will improve returns. The ability to improve farm incomes, or develop alternative incomes, as outlined previously, fits well with the Welsh Government themes.